(No Model.) 2 Sheets—Sheet 1.

C. D. ROGERS.

MACHINE FOR MAKING SCREW BLANKS.

No. 389,169. Patented Sept. 4, 1888.

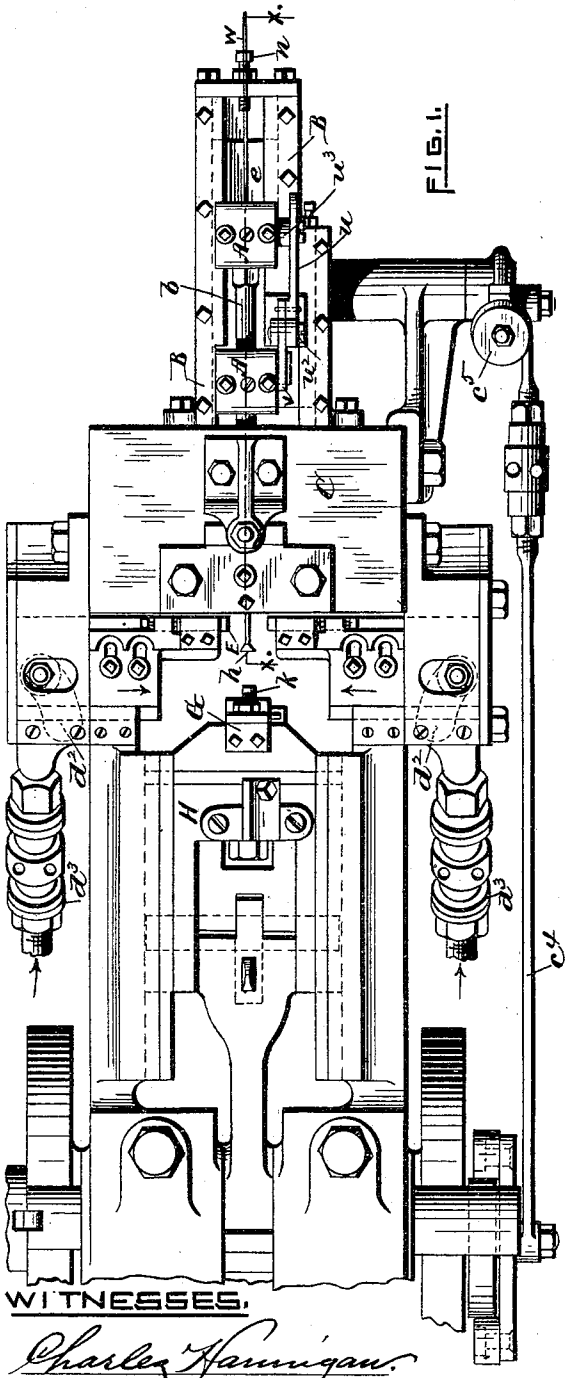

FIG. 1.

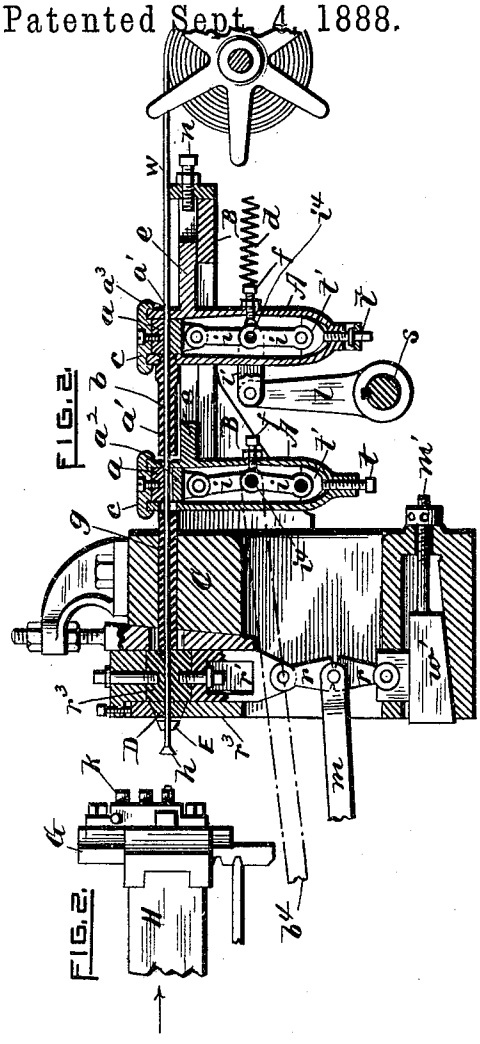

FIG. 2.

FIG. 2.

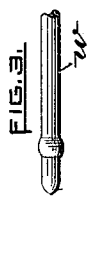

FIG. 3.

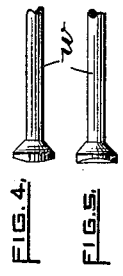

FIG. 4.

FIG. 5.

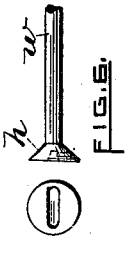

FIG. 6.

WITNESSES.

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INVENTOR.

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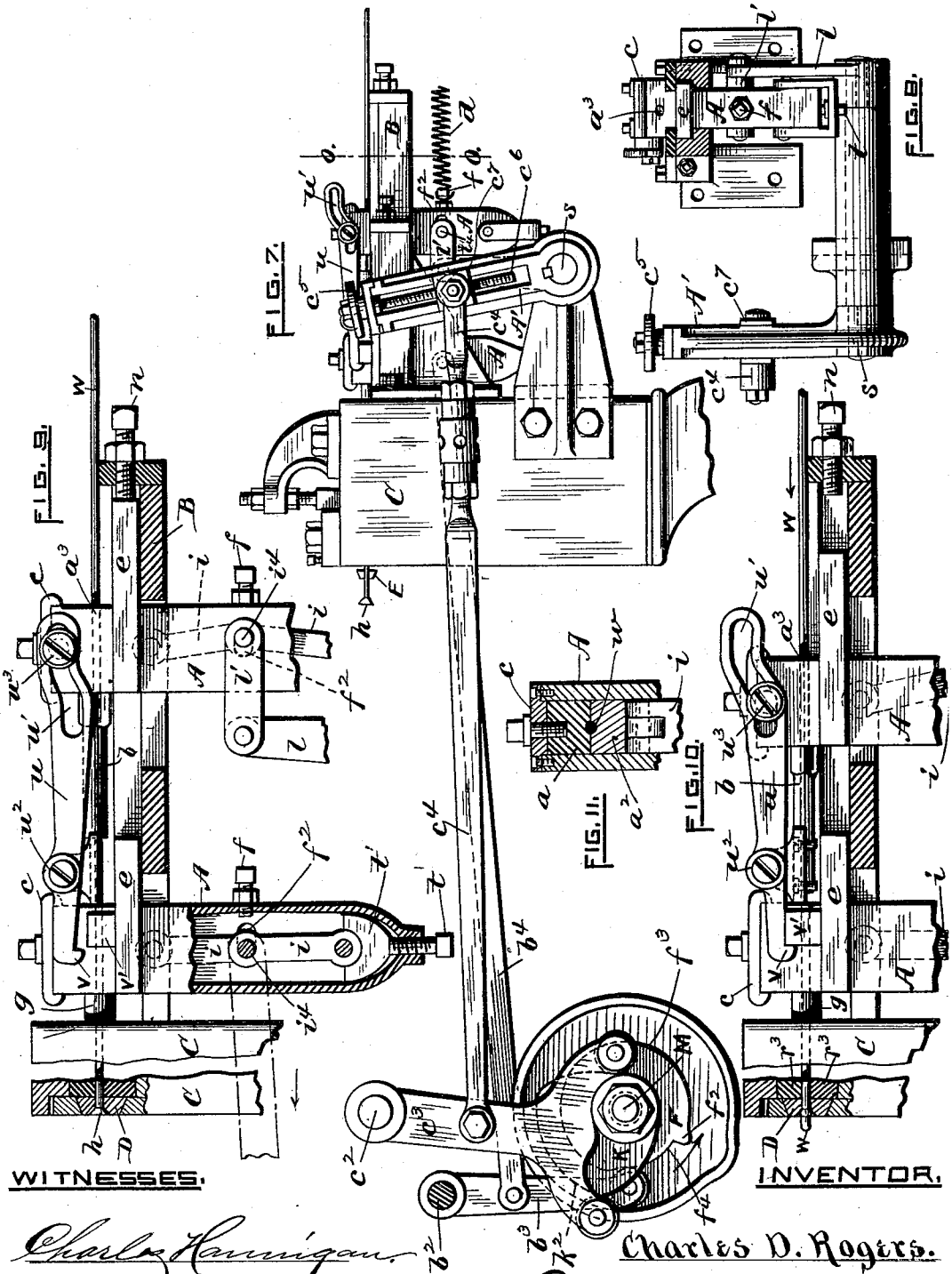
(No Model.) 2 Sheets—Sheet 2.

C. D. ROGERS.

MACHINE FOR MAKING SCREW BLANKS.

No. 389,169. Patented Sept. 4, 1888.



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Joseph Sanford.

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UNITED STATES PATENT OFFICE.

CHARLES D. ROGERS, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE AMERICAN SCREW COMPANY, OF SAME PLACE.

MACHINE FOR MAKING SCREW-BLANKS.

SPECIFICATION forming part of Letters Patent No. 389,169, dated September 4, 1888.

Application filed May 18, 1888. Serial No. 274,276. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. ROGERS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Feeding Mechanism for Machines for Making Screw-Blanks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In an application for Letters Patent filed by me July 7, 1887, Serial No. 243,657, I have shown and described a machine for automatically making screw-blanks, in which said blanks are produced from a coil of wire the end of which is intermittingly fed along after it has been upset in a solid die to form the head and then severed. In my application just referred to the solid die has a hole through it of the size of the wire or stock, the hole being countersunk or enlarged at the front of the die, thereby forming the die proper, which is the counterpart of the head to be produced. In upsetting the metal into this cavity the wire lying in the cylindrical hole of the solid die-block is so expanded that its removal is attended with considerable difficulty, from the fact that the upsetting of the head is effected before the blank is severed from the coil of wire. Therefore, it is necessary to provide not only a powerful clamping device to withstand the thrust of the heading-hammers, but it is found that a feeding device capable of starting the wire from the die after the heading-hammers have completed their work is very essential, supplemented and combined with a feeding mechanism arranged to continue and complete the feeding of the wire ahead the desired distance to produce a blank.

The object of my invention which forms the subject of this application is to provide a machine for making screw-blanks with improved means for automatically starting the headed wire from the hole in the die, the movement being continued and accelerated by a second or supplemental feeding device, which feeds the wire ahead the distance required and in advance of the action of the cutting-off dies which sever the blank from the coil of wire.

My invention consists, essentially, of two independent feed blocks or carriages mounted in ways and arranged to travel back and forth through the agency of suitably-shaped actuated cams and connections, each of the blocks being in halves and grooved to receive the wire or stock, the lower half of each block being connected with toggle-jointed levers, which in turn connect with the cams.

In the accompanying two sheets of drawings, Figure 1, Sheet 1, represents a partial plan view of a machine for automatically making screw-blanks and provided with my improved feeding devices. Fig. 2 is a vertical longitudinal central sectional view taken through the line *x x* of Fig. 1, showing the headed wire advanced to its limit preparatory to being severed. Figs. 3, 4, 5, and 6 represent the action of the heading-hammers upon the end of the wire in producing the head. Fig. 7, Sheet 2, is a partial side view of the machine corresponding to the position shown in Figs. 1 and 2. Fig. 8 is an end view in partial section, taken on line *o o* of Fig. 7. Fig. 9 is an enlarged side view in partial section, showing the feed-carriages, &c., the forward carriage being upon the point of advancing to force the headed blank from the solid die, the rear carriage being in its extreme position and resting against an adjustable stop. Fig. 10 is a view corresponding to the preceding figure after the blank has been severed from the wire, the forward carriage firmly grasping the wire and the rear carriage being in its extreme forward position; and Fig. 11 is a cross-sectional view taken through the upper portion of one of the feed-boxes.

A description of the several parts embodied in my improvement, together with the adjacent parts of the machine, is as follows:

C indicates the anvil portion of the machine, in which the solid heading-die D is mounted. Immediately at the rear of the die is arranged the wire-clamping device, which consists of the toggle-jointed levers *r*, an ad-

justably-mounted thrust-block, w', and gripping-clamps r^3. The upper half of the clamp is stationary and the lower half is secured to a guided connection, r', jointed to one of the levers r. A link, m, adapted to be actuated by a suitable cam, serves to alternately grip and release the wire. This arrangement, which, however, forms no part of my present invention, acts to rigidly clamp the wire while it is being upset into the die D to form the head h, and is released from the wire immediately thereafter, so that the devices about to be described may act to force the wire from the die and push it ahead the desired distance to produce a blank.

In the drawings, H indicates a cross-head mounted and connected to reciprocate in ways. (See Fig. 1.) To the front face of the cross-head a holder, G, is vertically mounted, in which is secured a series of heading-hammers, k, for upsetting the end of the wire into the cavity of the die D. This also does not constitute a part of the present invention, the same being described and claimed in my application No. 243,657, before referred to.

To the front end of the machine is secured an extension or frame, B, having guides therein, in which the two feed-boxes A are supported and mounted to reciprocate. These two boxes are substantially alike in construction, each being hollow and having links i connected and arranged therein to produce a toggle-jointed lever. A thrust-block, t', rests in the bottom of the box to receive and support the lower link. A screw, t, tapped into the end of the box, affords means for nicely adjusting the grip or pressure. A cap, c, is secured to the box, the same having the upper half, a, of the feed-block secured thereto on its under side. (See Fig. 2.) The other or lower half, a^2, of the feed-block is jointed to the upper link of the toggle-lever i. These feed-blocks are grooved to receive the wire w, substantially as described with reference to the gripping-clamps r^3 and as shown in Fig. 11. The center pin, i^4, which constitutes the "knee" of the toggle-lever, works in an elongated opening, f^2, Fig. 9, formed in the side of the feed-box. This slot is so arranged with reference to the center joint, i^4, that the centers of the three pins constituting the toggle-joint cannot be exactly in line. An adjustably-mounted stop, f, serves to limit the movement of the center joint in the opposite direction.

Immediately in front of the forward feed-box and in line with the center of the die and the feed-blocks (the term "front" being now considered in the direction of the traveling wire) is secured to the anvil portion C a stationary wire-guide, g, a guide, b, being secured to the front side of the rear or second feed-box. These guides assist to straighten the wire, and also serve to prevent its "crimping" while being fed along.

Mechanism for imparting motion to the feed-boxes is represented in Fig. 7, &c. A cam, K, secured to a lower shaft, M, in connection with a pivoted lever, c^3, engaging the cam, serves to vibrate a slotted lever, A', by means of a connecting-rod, c^4. This slotted lever is secured to a short shaft, s, mounted at the front end of the machine. The rod c^4 is jointed to a nut, c^7, constructed to slide in said slot, by means of the screw c^6 and hand-wheel c^5. To the opposite end of the shaft s is secured a lever, l, having a link, l', jointed to its upper end, which in turn is jointed to the center pin, i^4, of the toggle-lever. This arrangement obviously imparts an irregular reciprocating movement to the rear feed-box, A, corresponding to the contour of the cam K. The feed or length of wire to be cut off is controlled (within its limits) by the adjusting screw and nut mounted in the slotted lever A', the whole constituting the main feeding device. The other feed-box, which acts to forcibly eject the headed wire from the die D, is connected as follows:

A cam, F, (having a total "throw" of about one-quarter of an inch,) is secured to the shaft M, and by means of a pivoted lever, b^3, and connecting-rod b^4, jointed thereto and also to the center pin, i^4, of the front feed-box, A, acts to impart a motion to it corresponding to the cam's offset. An arrangement for automatically locking the starting feed-box in position preparatory to gripping the wire and forcing it ahead is as follows:

u indicates a two-armed lever pivoted at u^2 to a stand secured to the frame B intermediate of the two feed-boxes. The front end of the lever is provided with a hook, v, adapted to engage a lug, v', of the front box, A, the rear portion of the lever being provided with a cam-shaped slot, u', in which a roll, u^3, attached to the rear feed-box, travels.

The joint operation of the feeding devices and connected mechanisms is substantially as follows: We will assume that the headed wire has just been fed ahead the proper distance, as shown in Figs. 1 and 2, and that the cut-off dies E are about to be advanced from opposite sides of the machine by means of the operating-connections d^3 and cams d^2, (shown by dotted lines,) the wire meanwhile being held firmly in position by the gripping-clamp $r\,r'$ and the rear feed-block. After the blank has been severed from the coil of wire, the heading-hammers k will successively act to upset the projecting wire (see Fig. 10) into the solid die D and form the slotted head h. During this operation of heading the revolution of the shaft M will cause the rear feed-box to be forced rearwardly by the action of the cam K and connections and the retracting-spring d to the position shown in Fig. 9, and resting against the stop n.

It will be noticed that the roll u^3, in connection with the slotted lever u, at the same time

automatically unlocks the forward feed-box by lifting the catch v from the lug v' of the box. Immediately preceding the unlocking or lifting of the catch, however, the revolution of the other cam, F, will cause the roll mounted in the end of the arm b^3 to advance from the cam-surface f^4, Fig. 7, to the concentric surface f^3, thereby carrying the pin i^4 ahead in the slot f^2 to its limit, and thus firmly grip the wire by the vertical movement of the lower half of the feed-block a^2. At the proper time, by means of the continuous revolution of the cam-shaft M, the enlargement f^2 of the cam F will encounter the lever b^3 and advance the front feed-box, A, ahead about one-fourth of an inch. This latter movement, by reason of the grip of the feed-block upon the wire, carries the wire endwise a like distance in the same direction, thereby forcibly ejecting the headed wire from the die D. Now, while this is taking place the other cam, K, will have engaged the lever c^3 and caused the toggle-jointed lever i of the rear feed-box to grip the wire substantially at the same instant that the forward feed-box ceases its action. The rear feed will continue the movement of the wire (begun by the front feed) and advance it to its limit, the several parts then being substantially as represented in Fig. 2. I would state that the main gripping-clamp r^3 is automatically released just prior to the action of the front feed-box. After the roll passes the cam projection f^2, Fig. 7, it is immediately forced down upon the depressed surface f^4 of the cam F, thereby forcing the feed-box in a rearward direction and releasing the wire from its grasp. At the same time, or while it is thus moving rearwardly, the advancing or rear feed-box depresses the front end of the lever u, thereby locking the forward box in position preparatory to again feeding the wire after the formation of the next head upon it.

By means of the mechanism before described it is obvious that a wire may be headed in a solid die and then be forced therefrom without bending the stock or roughening its surface.

As before stated, the feed may be readily adjusted, corresponding to the length of screw to be produced.

I claim—

1. In a machine for making screw-blanks, the combination, with a solid die in which the head of the blank is formed and an intermittingly-actuated gripping-clamp, of a short-stroke feed-box provided with a jointed clamp arranged and connected so as to slowly start the headed wire from the die, and a second or supplemental feed-box having a similar clamp actuated by mechanism arranged to continue and complete the feeding of the wire ahead to form the blank, substantially as hereinbefore described.

2. In a machine of the class described, the combination of two wire-feeding devices each provided with a toggle-jointed and adjustably-mounted lever connected with the grooved clamp to receive the wire, and cams for actuating the feeding devices, the same being so constructed and timed that the first cam to act will force the headed wire from the die, immediately followed by the second cam, which completes the feeding of the wire to produce the blank.

3. The combination of a heading-die, a clamping device, a guide, as g, for the wire, a short-stroke feed-box provided with means for intermittingly gripping and releasing the wire arranged to travel in close proximity to the mouth of said guide, and an auxiliary feed-box having means for intermittingly gripping and releasing the wire, substantially as hereinbefore described.

4. In a machine for making screw-blanks, the combination of an initial or short-stroke feed-box having toggle-jointed cam-actuated levers for clamping the wire and feeding it ahead, and a similarly jointed and actuated supplemental feed-box for continuing and completing the feeding of the wire begun by the first-named feeding device, substantially as set forth.

5. A feed-box of the class described, having a gripping-clamp adapted to receive the wire, a toggle-jointed lever mounted therein connected with the gripping-clamp, and adjusting-screws for controlling the movement of said lever, substantially as hereinbefore set forth.

6. The short-stroke feed-box, substantially as herein described, arranged to first clamp the wire and having mechanism for forcing the box and wire ahead, combined with a supplemental feed-box having a guide, as b, secured thereto and having a clamp arranged to grasp the wire, and mechanism for actuating the clamp and carrying the feed-box and wire ahead to complete the feeding of the wire to produce a blank, and mechanism for releasing the clamps and returning the feed-boxes to the normal position.

7. The combination, with the forward feed-box, constructed, arranged, and operating substantially as described, and having a lug, as v', of the rear or supplemental feed-box, constructed, arranged, and operating substantially as set forth, and a locking-lever, as u, pivoted to the frame and engaging both feed-boxes, whereby the forward feed-box is held in a stationary position until the wire is firmly clamped therein, followed by the movement of the rear feed-box, which automatically releases the lever from the forward box preparatory to feeding the wire to produce a blank.

8. The combination, with the two feed-boxes mounted one in advance of the other and provided with toggle-jointed levers arranged to actuate the gripping-clamps, of mounted cams connected with the feed-boxes constructed and arranged so that the forward clamp will grasp

the wire and remain stationary until the clamp of the rear feed-box releases its hold upon the wire and returns to its normal position and again commences to advance, the forward clamp being then carried ahead to its limit, thereby forcing the headed blank from the die, instantly followed by releasing the wire, the rear clamp meanwhile engaging the wire and completing the feeding of the wire to produce a blank.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES D. ROGERS.

Witnesses:

CHARLES HANNIGAN,

GEO. H. REMINGTON.